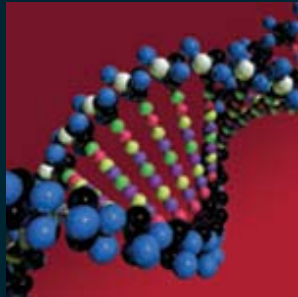


# Environmentally Sound Recycling of Spent Lead-Acid Batteries

## Air Pollution Control Best Practices



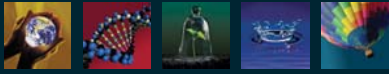
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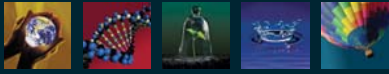
678-388-1654

[rkemp@environcorp.com](mailto:rkemp@environcorp.com)



# Environmentally Sound Recycling Multimedia Considerations

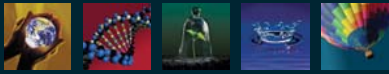
- Minimization of Land Impacts
  - Storage of batteries
  - Storage of intermediate materials (paste, acid, etc.)
  - Construction of surfaces and floors
- Minimization of Water Impacts
  - Acid Management – reclamation, treatment
  - Wastewater treatment – reuse
  - Stormwater management – runoff control, treatment
- Minimization of Air Impacts
  - Lead AND other constituents ( $\text{SO}_2$ ,  $\text{NO}_x$ , etc.)



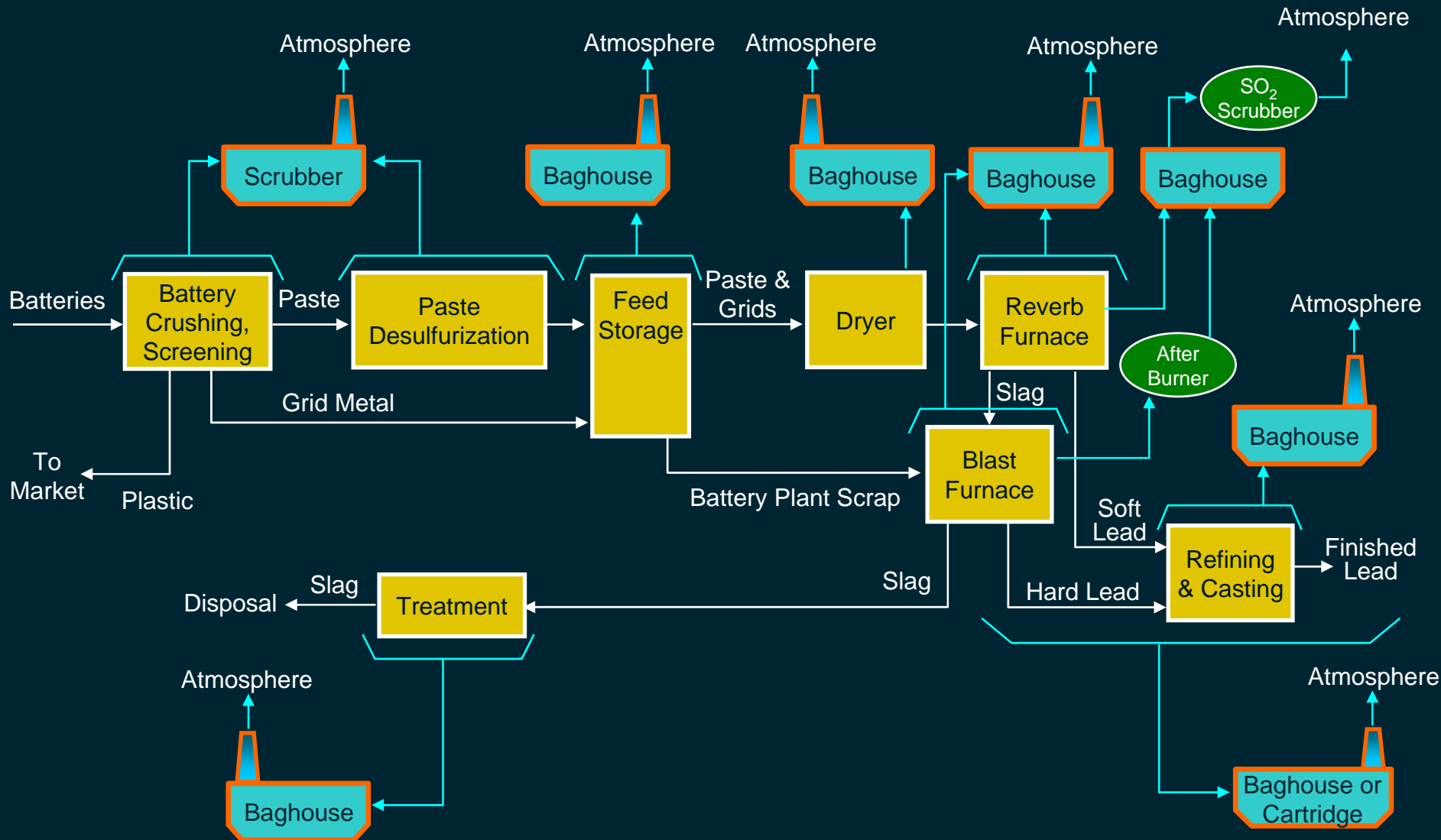
# Air Pollution Control: Motivations and Regulations

- Emission limiting standards at point of release:
  - Allowable lead concentration in stack (e.g., 2 mg/dscm)
- Ambient air quality standards:
  - Current U.S. and Mexico standard 1.5  $\mu\text{g}/\text{m}^3$  quarterly
  - Ozone, particulate, and other ambient standards
- Risk management and air toxics considerations
  - Community health risks
  - Litigation from neighbors
  - Accumulation of deposited dust in surface soil

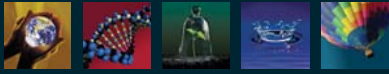




# Lead Recycling Process Flow and Emission Control







# Control of Ambient Impacts

- Control of fugitive emissions is key
  - Enclosure of lead-processing operations in buildings with controlled exhaust
  - Elimination of outdoor transfers
  - Control of tracking of dust onto road and yard surfaces
  - Pavement of road and yard surfaces
  - Regular cleaning and/or wetting of paved road and yard surfaces





# Monitoring and Instrumentation

- Continuous Emission Monitor (CEMs):
  - Common for sulfur dioxide
  - Nitrogen oxides sometimes monitored
- Parameter monitoring:
  - Afterburner temperatures
  - Baghouse pressure drops
  - Broken bag detection systems
- Ambient air monitoring: Primarily for lead







# Future Considerations

- Revised National Ambient Air Quality Standard (NAAQS) in United States:
  - To be promulgated in September 2008
  - Revised level expected to be approximately an order of magnitude lower than  $1.5 \mu\text{g}/\text{m}^3$ , and on a monthly average.
- Climate Change and Greenhouse Gases:
  - California requirements encompass secondary lead operations as a large stationary source
  - Focus on energy efficiency



# Information Resources

- U.S. OSHA's "e-tool" site has good information on best practices for hooding designs:

[www.osha.gov/SLTC/etools/leadsmelter/index.html](http://www.osha.gov/SLTC/etools/leadsmelter/index.html)

- Specifications for best practice emission levels in U.S. National Emission Standard for Hazardous Air Pollutants for Secondary Lead. Link to info page:

[www.epa.gov/ttn/atw/lead2nd/lead2pg.html](http://www.epa.gov/ttn/atw/lead2nd/lead2pg.html)